



Overview of OEMC Programs

RMAEE Meeting

October 15, 2004

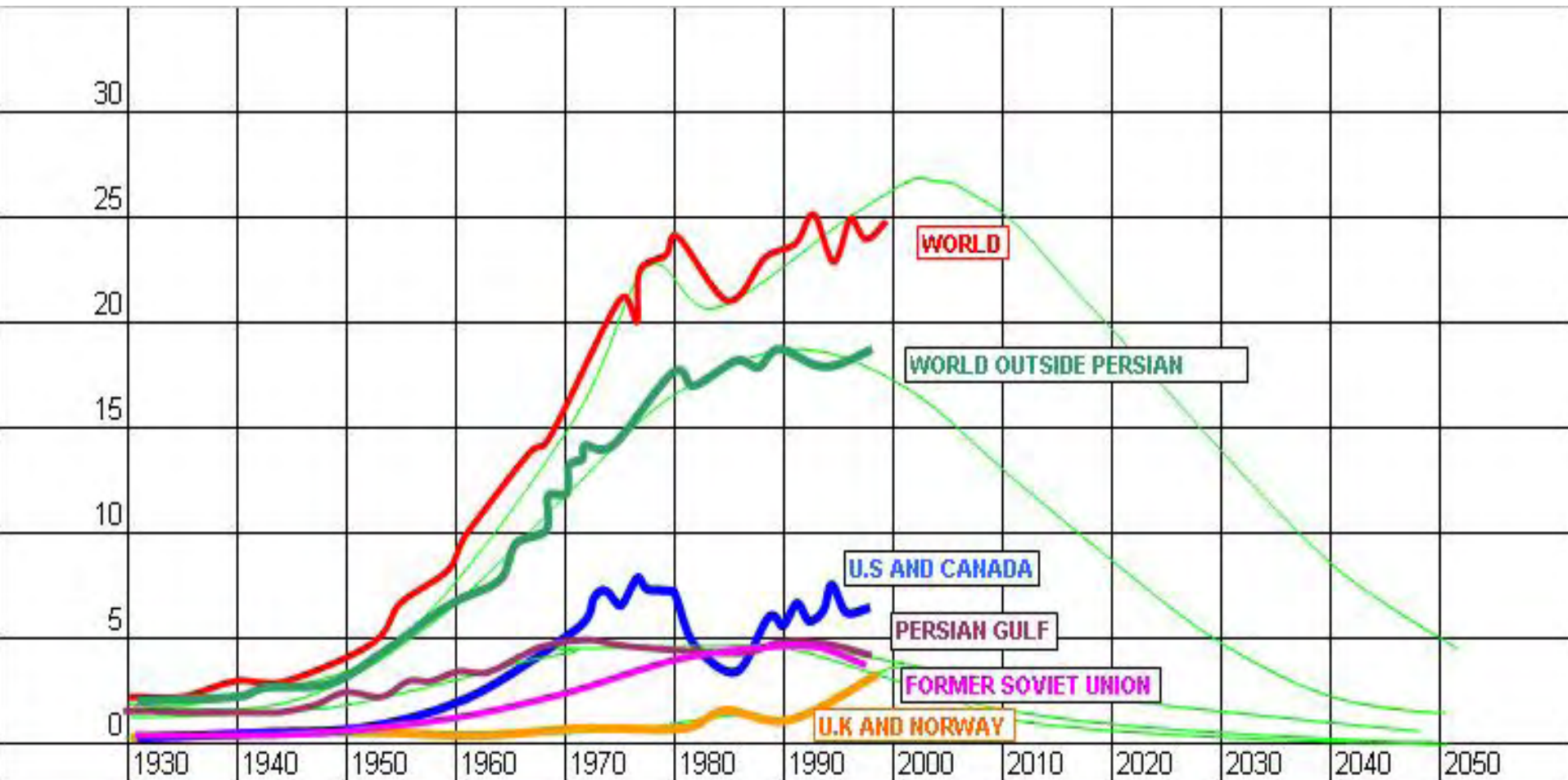
Tri State G&T

Ed Lewis, OEMC Senior Deputy Director

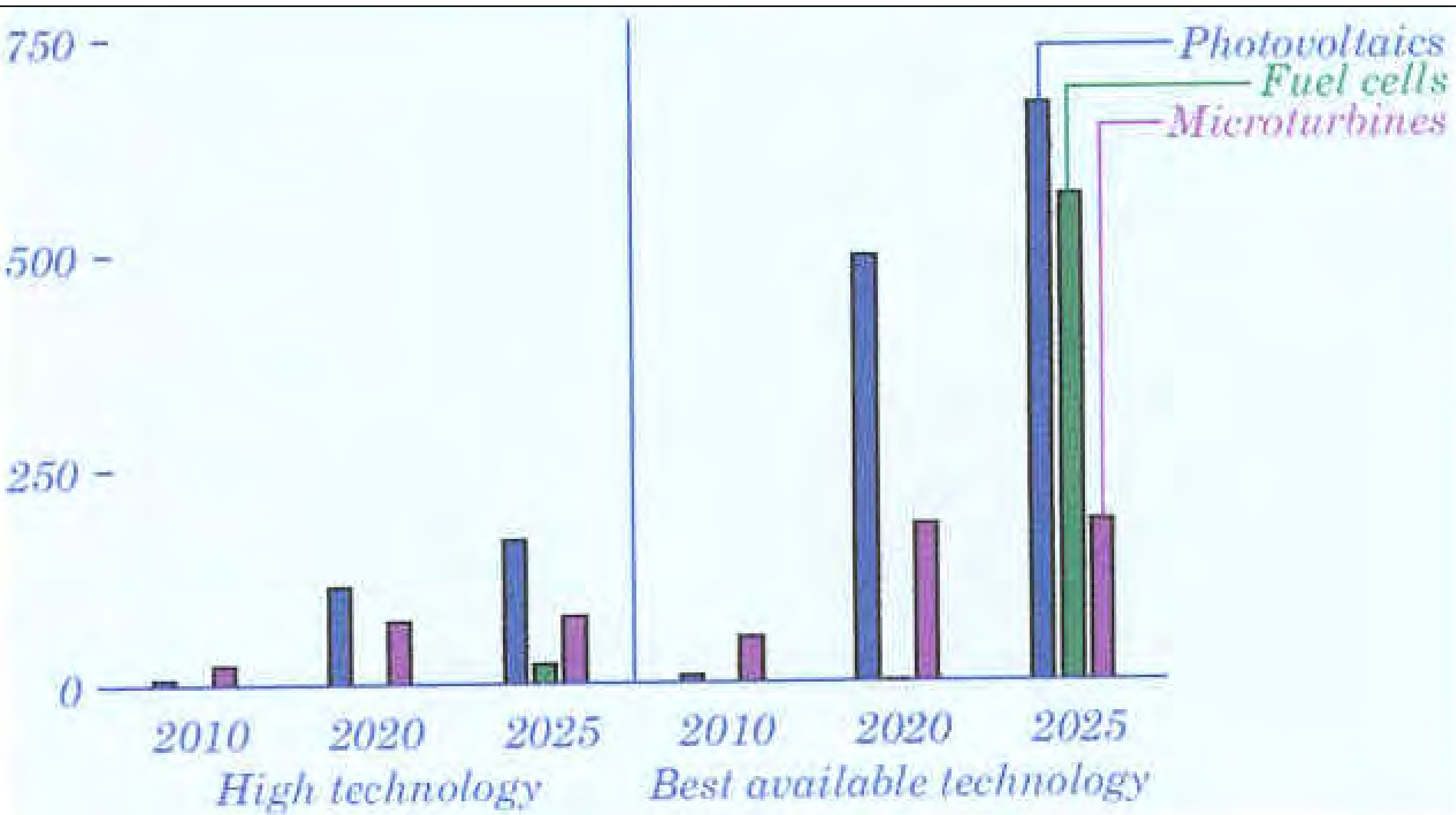
Office of Energy Management and Conservation Overview

- **Serves Colorado people and businesses through demonstration and education of real-world energy solutions and through application of weatherization programs**
- **Leverages funding through partnerships involving all groups benefited by energy demonstrations**
- **Federally funded; No Colorado tax dollars**
- **Founded in 1977**

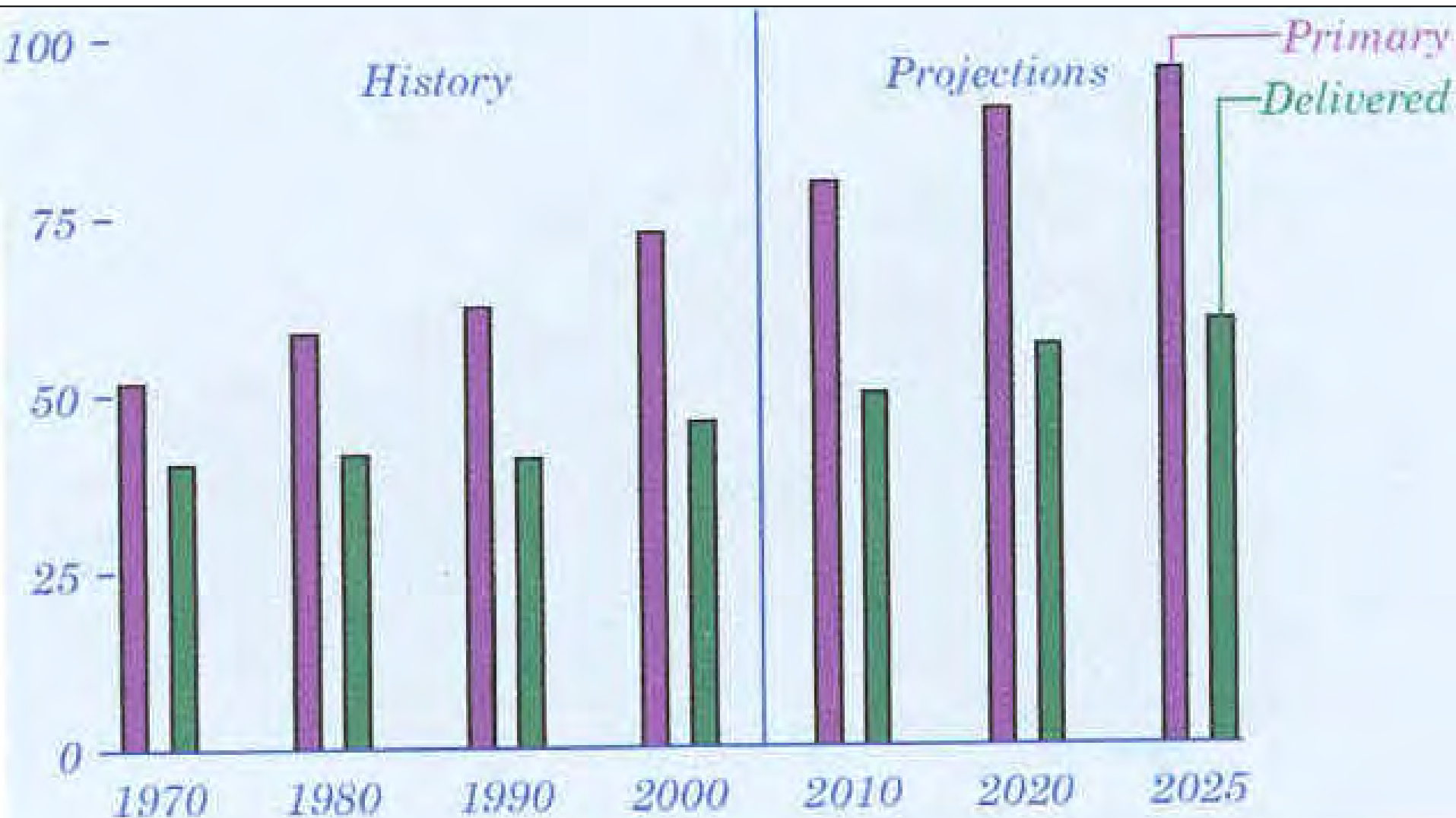
Petroleum Production Curves: Current Natural Gas Shortages are Estimated at 3-4 Billion Cubic Feet/day



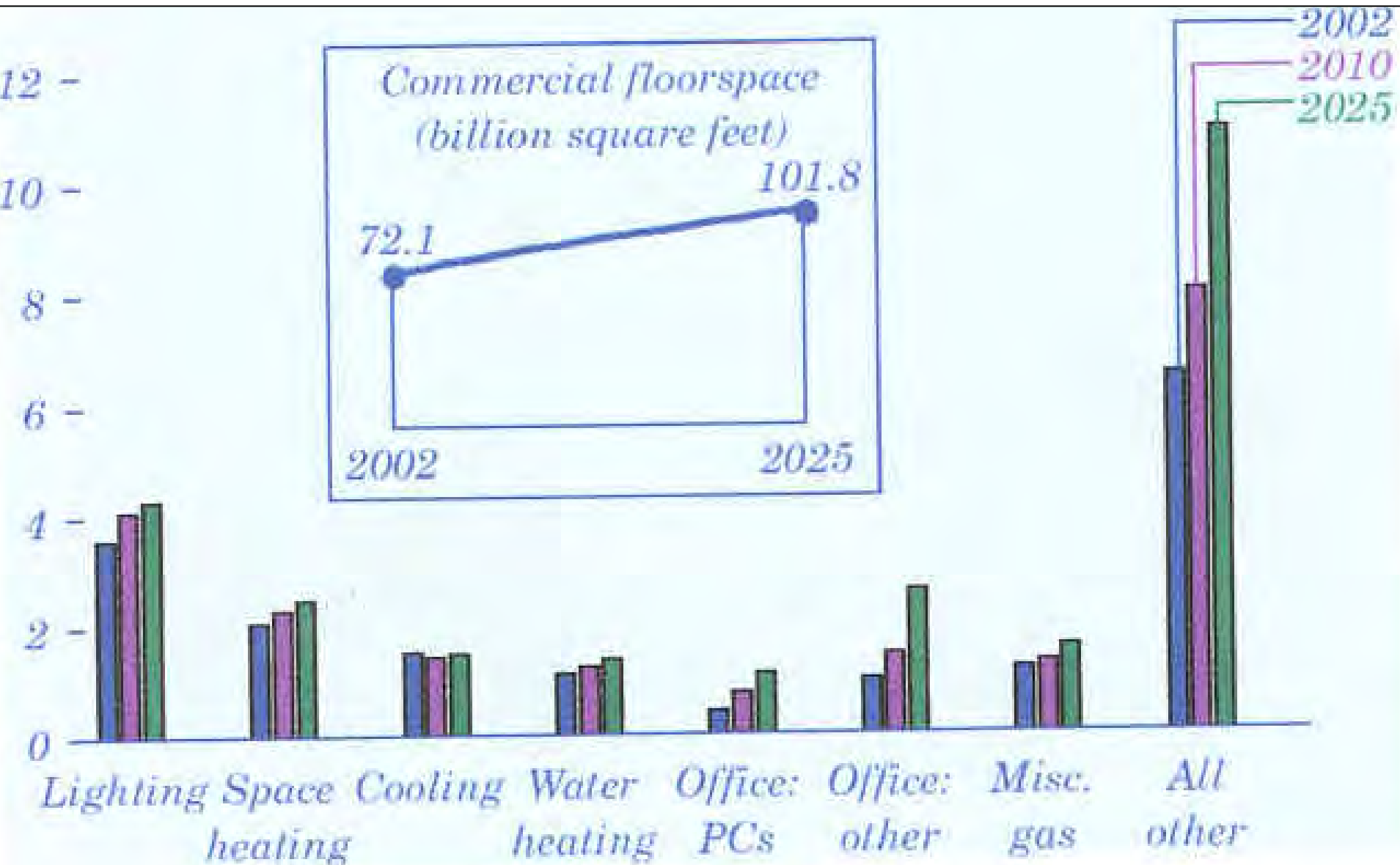
Buildings Sector Electricity Generation From Advanced Technologies (percent change from reference)



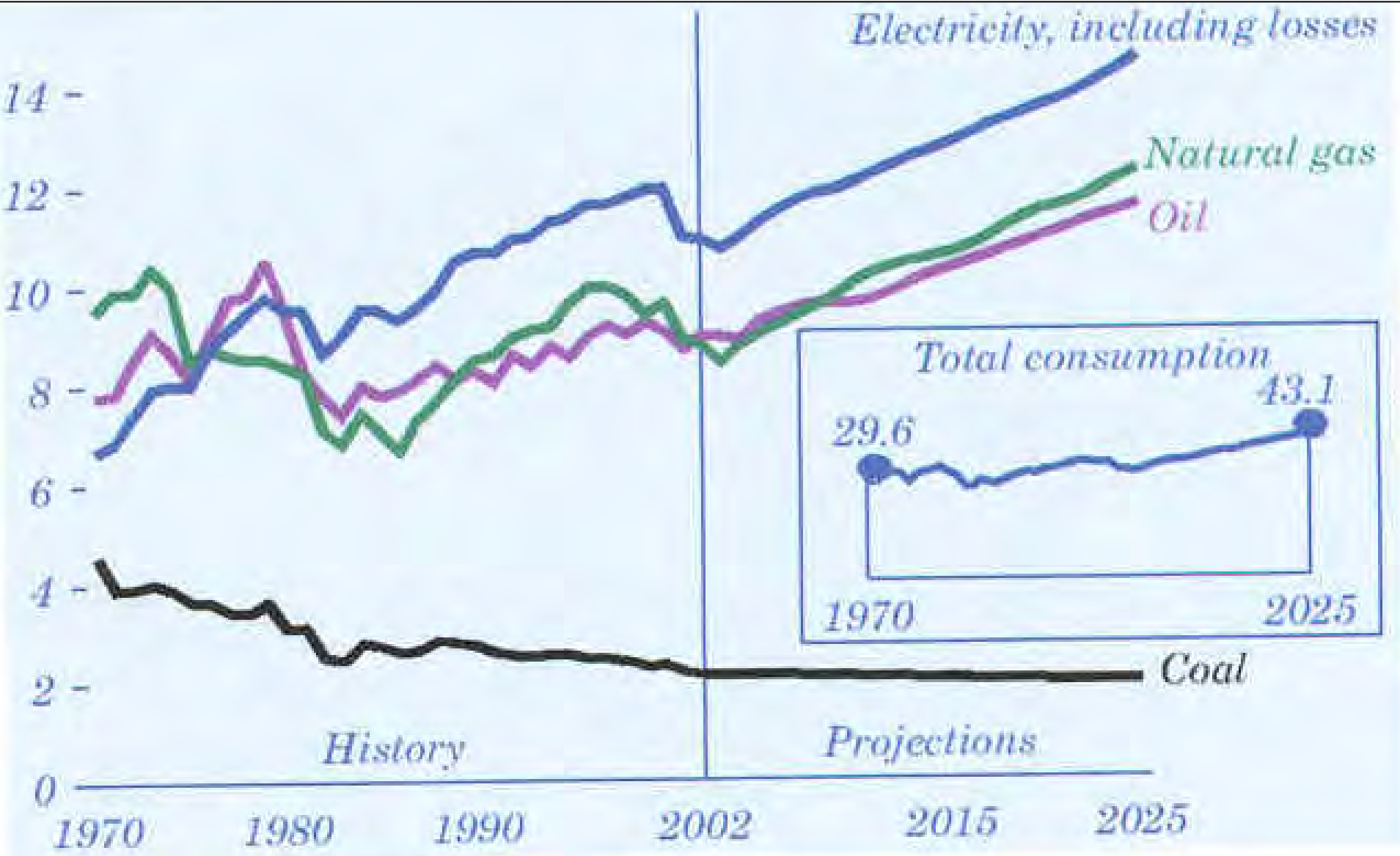
Primary and Delivered Energy Consumption Projections, Excluding Transportation Use (quadrillion Btu)



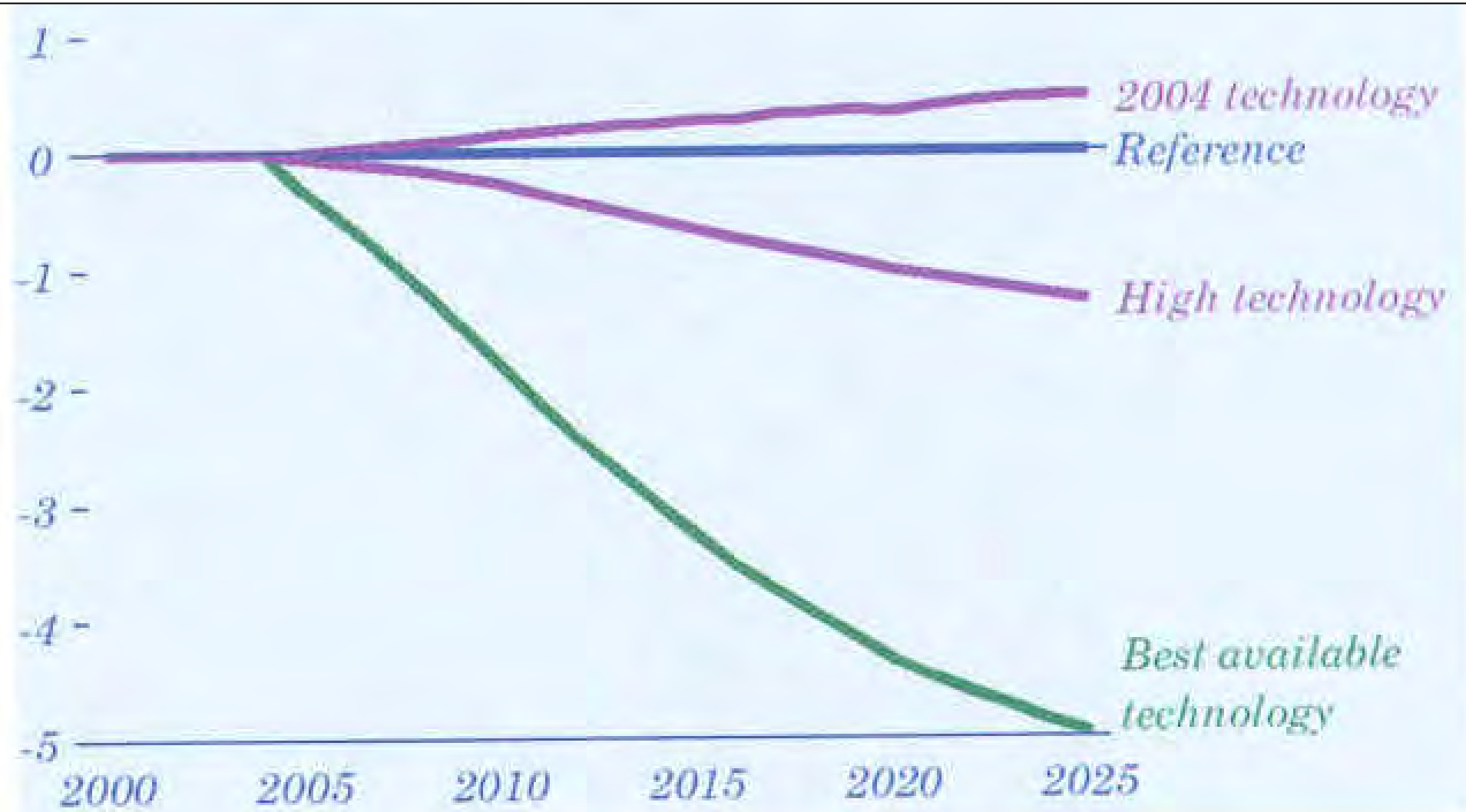
Commercial Primary Energy Consumption Increases Dramatically (quadrillion Btu)



Projection: Industrial Energy Use Grows by 46% by 2025 (quadrillion Btu)



Residential Energy Use Reductions Due to Advanced Technologies (Curve for Commercial Energy Use Yields Nearly Equal Reductions) (quadrillion Btu)



Energy Challenges

- Compete for shrinking petroleum supplies with:
 - rapidly growing world economies (epitomized by China)
 - other existing large economies (like Japan)
 - other states' large economies (like California)
- Rebuild and modernize the aging US grid
- Harden the defense of our energy infrastructure from terrorism and natural disasters
- Meet fuel needs during large-scale blackouts
- Incorporate greater numbers of generators using renewable-fuels, within and outside the grid
- Bring down the cost of, and mainstream, emerging energy technologies

Energy Challenges (Cont'd)

- Better insulate our economy from rapidly rising fuel costs
- Assist those who can't afford the rising costs of fuels
- Better understand exploding population dynamics to stay ahead of growth & outpace infrastructure needs
- Plan for vast increases in the elderly and the need for more energy for physical comfort and the treatment of serious ailments
- Educate people on energy effects of things like ever increasing horsepower in automobiles and light trucks
- Plan for energy requirements of new technologies before they mainstream

Energy Challenges (Cont'd)

- Maximize energy efficiency/conservation and sustainability in new housing and industrial complexes
- Layout building developments to capture solar, topographical, shading, geothermal and hydrological effects to save energy and provide comfort and safety
- Protect, or leave undeveloped, natural barriers which afford weather damage mitigation
- Maximize the blending of renewable and conventional fuels
- Maximize distributed generation and incorporate CHP as widely as possible (within and outside the grid)
- Design/build developments to capture CHP opportunities
- Effect a national interconnection standard with full safety for utility workers and reasonable costs for tie-in

OEMC Energy Efforts

- *Energy Conservation:*
 - weatherization (4100 houses/yr, \$12.6M for 2004)
 - education (brochures, workshops, radio and TV)
 - Ad Council advertisements (Energy Hog)
 - Rebuild Colorado's Savings Roundup Program
- *Energy efficiency:*
 - helped found and fund Built Green Colorado
 - founded/originally funded ERHC (now E-Star Colo.)
 - provides assistance for "Green Building" efforts
- *Energy codes:*
 - formed task forces to write Colorado-specific, voluntary commercial energy standards, reaching over 35% of the state's commercial buildings and to mainstream solar installations
 - assists jurisdictions in adopting current IECC and IRC codes (E-Star Colorado: ~82% (by population within jurisdictions) of Colo. residential buildings and likely equally significant, yet undetermined, numbers of commercial buildings are now covered)

OEMC Energy Efforts (Cont'd)

- *Geothermal:*
 - features all Colorado sites using geothermal energy sources on its website
 - helped persuade DOE to make ground-source (geo-exchange) the leading geothermal energy recovery method
 - on DOE regional geothermal advisory board
- *Performance Contracting (Rebuild Colorado):*
 - most successful/replicated state program in US
 - >\$100M state buildings completed or underway, covering >75M square feet
 - significantly more projects created indirectly
 - LEED grants up to \$20K for new bldgs. (\$250K remains)

OEMC Energy Efforts (Cont'd)

- *Agricultural Undertakings:*
 - wide-ranging rural energy program:
 - Anaerobic digestion
 - Composting (includes animal mortalities)
 - Precision irrigation
 - Wind energy production
 - small wind production
 - community scale
 - large scale
 - Forest restoration and thinnings uses
 - Nederland CHP
 - Leadville CHP
 - Jeffco power production
 - co-blending renewable and non-renewable fuels
 - new products

Wood-Fueled & Steam-Powered CHP Devices



OEMC Energy Efforts (Cont'd)

- *Hydrogen Production and Use:*
 - Electrolysis
 - On-grid
 - Off-grid
 - Pyrolysis
- *Emerging Energy Technologies:*
 - Microturbines using all three major manufacturers' units
 - Fuel cells
 - Denver fire station
 - Hydrogen and Fuel Cell Center of Colorado
 - Stirling engine

Microturbines



Fuel Cells

PEM



PAFC



Courtesy of UTC Fuel Cells

Stirling Engine



OEMC Energy Efforts (Cont'd)

- *Waste stream treatments yielding renewable benefits:*
 - Chemical/thermal
 - Composting
 - Incineration
 - Constructed/remediated wetlands
 - Landfills

Thermal/Chemical Conversion



For More Information, Please Contact:

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